THE AUSTRALIAN PLANT DISEASE RECORDER.

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I N D E X.

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PLANT DISEASE NOTES.

CEREALS AND GRASSES.

HELMINTHOSPORIUM SP. FROM RICE:

Among other organisms, a species of Helminthosporium was isolated from rice received from the Plant Quarantine Station, New Guinea, and examined under strict quarantine conditions at Sydney. The Helminthosporium was isolated from surface sterilised leaves, and difficulty was experienced in assigning it to the correct species. From the spore morphology it appeared closer to H. sativum than to H. oryzae (Cochliobolus miyabeanus), the main difference between the two species being that the former has blunter spore ends than the latter. Great variation was found in size of spores produced in culture, compared with those produced in humid atmosphere from lesions as a result of inoculation. Inoculation tests produced reactions on leaves of the New Guinea variety and Blue Rose rice, Federation wheat and barley (C.I.2215), being very small on the last three.

Inoculations of H. sativum (S.U. Acc. 221) originally isolated from wheat, on to Blue Rose and Caloro rice gave very tiny lesions on the leaves, while Kinver barley showed the typical large lesions associated with H. sativum.

Many workers have noted the wide host range on grasses and cereals (under laboratory conditions) of H. oryzae, and Mitra (Trans. Brit. Mycol. Soc., 15 : 255-293, 1930) recorded that rice is susceptible (again under laboratory conditions) to H. sativum from wheat and barley. Rice grown on the M.I.A. is considered to be free of disease, and the writer thinks it is pertinent that, considering the known prevalence of H. sativum over most of N.S.W., no infection of rice by a Helminthosporium has been recorded here. Watts Padwick (Kew, 1950) could find no record of natural infection of any alternate host with H. oryzae (with one exception), and it might be that the morphologically very similar species, H. sativum, does not, under natural conditions in the field, attack rice. This aspect is one which warrants further attention in our rice areas.

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— DOROTHY E. SHAW.

MISCELLANEOUS RICE MICROFLORA:

Organisms well known as rice microflora were also identified on rice from New Guinea (see preceding article).

The commonest organism produced under humid conditions was Nigrospora oryzae. The range of spore diameters was from 12-18 μ, and as this takes in the ranges of N. oryzae and N. sphaerica, the organism is referred to as N. oryzae (B. & Br.) Petch. Germination of spores was obtained, but no lesions resulted from inoculation tests.

A species of Leptosphaeria was produced in humid atmosphere. The spores were 3-septate and measured 20 x 4 μ average (range from 20-22 μ x 3-4 μ) which is less than one-half the length of spores of L. salvinii, which causes the Stem Rot or Sclerotial Disease of rice. Of the other recorded species, L. elongata is the nearest, but as paraphyses were not observed, the fungus would probably be a Trematosphaerella, of which T. oryzae (spores 22-28 μ) is pathogenic, and T. cattanei (spores 16-23 μ) is of doubtful pathogenicity. Single spore isolates of the species from rice, inoculated on to rice seedlings, failed to produce lesions.

A species of Curvularia was produced abundantly on diseased leaves in humid atmosphere, and from surface sterilised leaves and grain. The isolate produced a reaction on leaves of the New Guinea variety, and faint reaction on leaves of Blue Rose seedlings, after inoculation. From the size of the spores, number of septa and symmetry, the isolate corresponds to C. lunata rather than C. geniculata, C. maculans or C. pallescens.

A species of Fusarium, and a Cladosporium sp. (?) were also obtained but no further work was carried out on these isolates.

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— DOROTHY E. SHAW.

INSECT TRANSMISSION OF ERGOT IN PASPALUM:

For the past 15 years ergot has been prevalent each summer in Paspalum dilatatum in eastern Australia. Each year the disease spreads rapidly in coastal areas and the majority of plants become infected. The conidia, embedded in the sticky honey-dew are not adapted for dissemination by wind. In other countries, observations that insects frequently visited ergot-infected plants have led to the conclusion that insects were mainly responsible for the spread of ergot. In Queensland, this has been accepted as the most probable mode of dissemination of ergot, but until recently no precise data on the subject had been obtained.

Between March and June, 1951, investigations have been made to determine the insect population of ergot-infected Paspalum dilatatum and what capacity as vectors various insects may possess. A summary of the results follows.

Insects from the following orders have been found on ergot-infected plants:- Thysanoptera (Thrips), Hemiptera, Coleoptera, Hymenoptera, Lepidoptera and Diptera. The predominant group was Diptera, and the species present in greatest numbers was Pyrellia caerulea, an indigenous fly which breeds in fresh cow manure. This latter insect was studied in some detail.

Pyrellia caerulea was observed to move about in Paspalum stands, feeding on honey-dew and also resting on uninfected inflorescences. In its gut numerous conidia were seen, and large numbers of conidia were passed in the faeces. Germination tests with conidia from both gut and faeces showed that the spores were viable after passage through the insect. Conidia in faeces allowed to dry in the air remained viable for at least 3 days. Viable conidia were passed by flies for a week after they had been taken from Paspalum plants and transferred to cages where they were fed on commercial honey. The ability of Pyrellia to spread the disease was proved when specimens from infected Paspalum stands were caged with Paspalum plants in a glasshouse. The plants became infected following two hours contact of the insect and young inflorescences.

Thrips and aphids were found moving about on inflorescences, and there is evidence that they are of some importance as secondary vectors, moving inoculum about within the confines of an inflorescence. Faecal material deposited by Pyrellia may be brought into intimate contact with the florets by these insects.

Other insects - various Diptera and Hymenoptera, have the capacity to spread inoculum, both mechanically and through faeces, but their numbers were so small in comparison with the population of Pyrellia that they are probably of only minor importance.

Pyrellia caerulea is regarded as the chief vector of ergot in Paspalum in southern Queensland. Conidia passed in its faeces could germinate in moisture deposited as dew or rain, and if not already in contact with the florets, may be moved there by accessory vectors such as thrips and aphids.

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— B. CHAMP AND R.F. LANGDON.

FIELD AND FODDER CROPS.

RUST OF WHITE CLOVER:

White clover on the North Coast of N.S.W. was severely attacked by *Uromyces* sp. this winter; severe infections being recorded from as far north as Byron Bay. The abundant development of the aecial stage on the petioles, veins, flower stalks and even young stems caused a yellowing and dying back. Teleutosori, where present, were confined mainly to the leaf blades.

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-- P.G. VALDER.

VEGETABLES.

TOMATOES AFFECTED BY HIGH pH IN SOIL:

Specimens of tomato plants showing stunted growth accompanied by leaf yellowing and necrosis were recently received from two glasshouses located in different districts. In each case the symptoms were highly suggestive of minor element deficiency but they did not conform with those of any single element. No pathogen was present.

The pH range of both soils was between 7.0 and 7.6 and both had been subjected to heavy applications of dolomite. Sulphur was drilled into the ground at the rate of two ounces per square yard at a distance of about 6" on either side of each row, and the pH of each soil was lowered to between 5.0 and 6.0. In one case there was a very obvious improvement in the crop and in the other the plants resumed normal growth and excellent colour.

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-- W.S. SUTTON.

ANTHRACNOSE OF FRENCH BEANS:

It was reported last year (A.P.D.R. 2 : 4 : 50, 1950) that two distinct strains of the bean anthracnose fungus had been found in New South Wales.

These two strains, provisionally designated strain 1 and strain 2, can be distinguished by the reaction of Tweed Wonder and Wellington Wonder, both of which are resistant to strain 1 but susceptible to strain 2. Last year strain 2 was isolated from beans from the Gosford district. More recently strain 2 has been found in several consignments of beans received at the Sydney Municipal Markets from the far North Coast of New South Wales and also in one consignment of beans from Queensland. However, specimens of anthracnose submitted by Mr. H. Freeman from a crop grown at Orbost, Victoria, proved to be strain 1. No evidence has yet been obtained that strain 2 occurs in the seed-growing districts on the South Coast of New South Wales.

It is possible, of course, that with a wider range of differentials it might be possible to separate more than two strains from the material so far studied.

In connection with these investigations the writer would appreciate receiving specimens of anthracnose-affected pods or culture of the fungus from other parts of Australia.

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— R.D. WILSON.

FRUIT.

RIPE SPOT OF STURMER APPLES:

A common disorder of Sturmer apples in Tasmania is the development on the fruit, of sunken brown spots, surrounded by conspicuous reddish borders. The spotting does not develop until the crop has reached maturity, and becomes more prevalent if fruit are allowed to remain on the trees after they are mature.

Cultures prepared from infected fruit have shown that a species of Gloeosporium is associated with the disease. Inoculations into sound fruit showed that the fungus is pathogenic to apples, but the symptoms produced differed from those in the field, and consisted of a rather slow spreading soft brown rot, which developed concentric rings of the type characteristic of target spot. However, the fruit inoculated were fully mature, and it has been noted that a similar rot develops from natural infections if the fruit are left until they become over-mature.

Results obtained in a spraying trial showed that tetramethyl-thiuram disulphide (Thiotox) applied for the pink and calyx stages, and for the cover sprays gave almost complete control of the disease. Thiotox as a cover spray following lime sulphur for the earlier sprays gave significantly poorer control. Formate and lime sulphur as cover sprays resulted in moderate control, while colloidal sulphur gave the poorest result of any material tested.

These results indicate that much of the infection occurs as early as the calyx stage, but remains latent until the fruit are mature. They also show that control can be obtained without the use of prepink sprays.

The species involved has not been determined, but appears to be either Gloesporium album or the imperfect stage of Neofabraea malicorticis.

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- G.C. WADE.

MANGANESE DEFICIENCY IN PEACH TREES:

In the spring of 1948 a peach grower at North Ryde near Sydney brought to notice a condition of foliar mottling consisting of an intervenal and marginal chlorosis with the tissues immediately adjacent to the main veins remaining green. This condition had been in evidence for some years in practically all trees in the orchard and by the spring of 1948 lateral die-back was commencing on the most severely mottled trees. There was no reduction of leaf size and no tendency to rosetting.

The mottling was completely and rapidly corrected by the application in December, of a spray consisting of 5 lb. manganese sulphate and 2½ lb. rock lime to 100 gallons of water. On sprayed trees and sprayed sections of trees the leaves assumed a uniform dark green colour and the new growth, which showed no mottling, was more vigorous than that on the controls.

The sprayed trees went into dormancy without any recurrence of symptoms, but, although the leaves were normal at the commencement of growth the following season, mottling became more and more evident as the leaves matured, and by mid-summer there was no difference between the sprayed and unsprayed trees.

Unfortunately, it was not possible to carry out any further investigations in this orchard.

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-- K.E. HUTTON.

ORNAMENTALS.

CHOCOLATE SPOT VIRUS OF NARCISSUS:

In 1946 van Slogteren and de Brujn (Daffodil and Tulip Year Book, 1946, pp. 3 - 20) described, under the name of chocolate spot, a virus disease of narcissus distinct from mosaic and stripe. Affected plants developed dark brown blotches and short streaks on the foliage early in the season, before flowers were produced.

This disease was observed recently, for the first time in New South Wales, on every plant in a commercial crop of King Alfred daffodils grown from bulbs imported from Victoria. The effect on vigour and flower production appeared to be less severe than that of stripe.

Department of Agriculture,
Sydney.

-- LILIAN R. FRASER.

BULB SCALE MITE:

Until this season the bulb scale mite pest was not known in New South Wales, but during the last few months daffodils showing various aspects of mite damage have been submitted from several localities. Some of the symptoms are sufficiently similar, superficially, to those produced by bulb eelworm or the stripe virus for errors to be made in field diagnosis by one unfamiliar with the mite.

Affected bulbs, when cut across, show brown shrunken areas on the scales which can involve a considerable area and so produce a ring type of browning. Leaves may be distorted, streaked and flecked.

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— LILIAN R. FRASER.

CORRECTION:

With reference to the note "Downy Mildew on *Trachymene* (Umbelliferae)" in A.P.D.R. 3 : 3: 40, 1951, it has since been found that owing to insufficient material and inaccurate information received, the host was incorrectly named. The host is *Scabiosa columbaria*. No previous record has been made of the *Peronospora* sp. on *Scabiosa* in Queensland.

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— DAPHNE MATTHEWS.

MISCELLANEOUS PLANTS.

BREMIA LACTUCAE REGEL. ON SENECIO VAGUS F. MEULL:

This fungus was found on *Senecio vagus* at Wallaby Creek, near Kinglake (Vic.), in December, 1950. Young plants were killed outright, but on older plants only the lower leaves were destroyed.

Characteristic *Bremia* sporangiophores were produced but no oospores could be found.

This fungus-host relationship has not been recorded previously in Victoria.

— L.B. THROWER.

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MISCELLANEOUS NOTES.

METHOD OF OBTAINING PHYTOPHTHORA INFESTANS IN PURE CULTURE:

This fungus is notoriously difficult to obtain in pure culture, as its growth is usually suppressed by associated bacteria. Pure cultures have occasionally been obtained by the writer when sporangia were lifted away from diseased tissue in a loop of sterile water and touched onto autoclaved pieces of bean pod or onto pea flour agar slopes.

Although the utmost care was taken to avoid touching the host tissue when lifting away the sporangia, successful isolation was rarely achieved. It was subsequently found, however, that pure cultures could be obtained quite simply by the following method:-

Under aseptic conditions, blocks of tissue about 1" x ½" x ¼" were excised from ripe fruits of *Solanum melongenum* and laid flat on freshly poured plates of P.D.A. Each block of tissue was then inoculated on its upper surface with a very small drop of sporangial suspension, and the plates incubated at 20°C.

The blocks of tissue became infected, and after about a week the fungus grew out onto the P.D.A., in most cases free from bacterial contamination. A piece of the agar bearing the mycelium was then lifted out onto autoclaved bean pod or pea flour agar where the fungus developed rapidly. It was found that pieces of P.D.A. bearing the mycelium could be more easily obtained if the blocks of eggplant fruit were lifted away first.

This method proved satisfactory for isolates both from potato and tomato, and results were almost as good when potato tuber was used in place of eggplant fruit. Very green tomato fruits and ripe fruits of *Solanum pseudocapsicum* were also used and a measure of success obtained, but no growth occurred when fruits of *S. opacum* or *Capsicum annuum* were used.

The pea flour agar used was prepared according to the method of Dickinson and Keay (Nature 162 (4105): 32, 1948). Owing to its soft moist nature it has been found to be rapidly over-run by bacterial contaminants and therefore is unsuitable as the initial isolating medium. P.D.A. on the other hand, while supporting only a very sparse growth of *Phytophthora infestans*, has not this disadvantage.

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-- P.G. VALDER.

THE PERFECT STAGE OF SPHAEROTHECA PANNOSA (WALLR.) LEV:

The perfect stage of this fungus was found on a rose (Rosa multiflora Thunb.; a rambler variety) in the System Garden adjoining the Botany Department, Melbourne University.

Cleistocarps were found, embedded in a white stroma, around the bases of the thorns. They were light to dark brown, globose to ovoid, 80 - 110 μ in diameter. Appendages were few and light coloured.

Each cleistocarp contained a single ovoid ascus and these asci averaged 70 x 57 μ. The ascospores, eight per ascus, averaged 22 x 15 μ.

The perfect stage of S. pannosa has not been reported previously in Australia.

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University of Melbourne.

— L.B. THROWER.

ALBUGO SP. ON BRACHYCOME DECIPIENS:

Albugo sp. was found on Brachycome decipiens Hook. f., in the vicinity of the "Scout Hut", Bogong High Plains (Vic.), in January, 1951. Characteristic white rust pustules were present on the leaves.

The conidia were spherical, or nearly so, measuring 17-20 μ (average 19 μ) in diameter. Oospores were numerous in the mid-rib region of the leaves and when mature they were approximately globose with diameters of 51 - 60 μ.

Albugo tragopogonis Pers. ex S.F. Gray, has been reported on members of five Tribes of the Compositae, but it has not been reported on any member of the Tribe Astereae.

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— L.B. THROWER.

SUSCEPTIBILITY TO ISARIOPSIS GRISEOLA:

In testing bean varieties and other plants with a single spore isolate of Isariopsis griseola it was found that, under glasshouse conditions, Poona cowpea was immune, Phaseolus caracalla highly resistant, and Dolichos lablab moderately susceptible.

Department of Agriculture,
Sydney.

— P.G. VALDER.

COMMONWEALTH MYCOLOGICAL INSTITUTE NOTES.

DUPLICATION BY F.A.O. OF C.A.B. SERVICES:

This matter was referred to in A.P.D.R. 3 : 3: 44, 1951. Dr. Wiltshire has since informed the writer that everything possible is being done by the Executive Council of C.A.B. to avoid an expensive organisation being built up by F.A.O. which will duplicate existing services carried out by the Commonwealth Mycological Institute and the Commonwealth Institute of Entomology.

Interest in this matter seems to be widening. The Report of the meeting of the South Pacific Commission held in Suva in April this year contains the following: "In establishing the Information Centre and Reporting Service elsewhere mentioned to cover diseases and pests in the region, full advantage should be taken of existing review and information services, especially those being provided by the Commonwealth Bureaux of Entomology and Mycology". The recommendations adopted by the 34th Meeting of the Australian Agricultural Council held recently included the following: "Care should be exercised that F.A.O. does not duplicate the work of the Commonwealth Bureaux of Mycology and Entomology, but recognises that each has a service in Plant Quarantine".

C.A.B. GENERAL NEWS:

1. The Commonwealth Potato Collection has been transferred to the Agricultural Research Council of the United Kingdom Government. This transfer became effective on 1st April, 1951.

2. The Republic of India has decided to continue its membership of C.A.B. and the Government of Pakistan has also confirmed its decision to continue membership.

3. Mr. W. Ives has succeeded Mr. A.B. Cashmore as C.A.B. Liaison Officer for Australia.

4. The following publications have been issued by C.A.B.:-

   (i) The Association of Ants with Aphids and Coccids (Nixon).
   (ii) Annotated Bibliography of Medical Mycology for 1949.
   (iii) Fungi of Trinidad and Tobago (Baker and Dale).
   (iv) Studies on four Species of Ceratocystis (Bakshi).

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Sydney.

— C.J. MAGEE.